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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF

KIMIO INOUE : EXAMINER: SORKIN, DAVID L.

SERIAL NO: 09/767,885 :

3RD RCE FILED: AUGUST 15, 2005 : GROUP ART UNIT: 1723

FOR: SCREW SET FOR EXTRUDER :

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313
SIR:

I. REAL PARTY IN INTEREST

The real parties in interest are the assignees of record, KABUSHIKI KAISHA KOBE SEIKO SHO of Kobe, Japan.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-9 have been cancelled. Claims 10-13 stand rejected and are being appealed.

IV. STATUS OF AMENDMENTS

All amendments have been entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The invention is directed to solving a problem for twin screw extruders wherein slight shifts in the axial position of screw sets within an extruder can cause interference between the elements of the screw sets unless spacers are provided. According to a feature of the invention set forth in Claim 10, each screw set in a twin screw extruder is formed from segments having the same sectional shape, except for the crest portions of the blades thereof, which are shaped depending upon the function of each segment (see sentence bridging pp. 4-5). Since the various segments are formed with the same sectional shape, except for the crest portions of the blades thereof, axially misaligned screw sets will not interfere with each other even when all of the segments are directly interconnected without using any spacers (see page 11, lines 7-11).

For example, referring to the non-limiting embodiments of the figures, a screw set in the chamber 4 of a barrel 3 can have one or more screw segments 11, one or more rotor segments 12 and one or more kneading segments 13, which may be arranged in the order shown in Fig. 1A. The kneading segment 12 is comprised of kneading rotors 14-16 which may have different tip clearances 14b, 14c but which have the same sectional shape along their axial lengths. Also, except for the crest portions, the kneading rotors 14-16 have the same sectional shapes as the screw segments 11 and the kneading disks 13 (page 9, lines 8-9).

VI. GROUND'S OF REJECTION TO BE REVIEWED ON APPEAL

Claims 10-13 stand finally rejected under 35 U.S.C. § 103 as being obvious over U.S. patent 5,947,593 (Inoue et al).

VII. ARGUMENT

According to this rejection, the claimed feature of a screw segment which, except for crest portions of the screw blades thereof, has the same sectional shape as a rotor segment, is taught in Inoue et al by relying on the rotor segment 1b of Inoue et al as both the claimed screw segment and the claimed rotor segment. The Examiner has therefore relied on the unremarkable fact that the rotor segment 1b has the same shape as *itself*.

A threshold issue is whether the kneader shown in the embodiment of Figs. 1-3 of Inoue et al teaches the claimed feature of a screw segment of a screw set having the same sectional shape as a rotor segment of the screw set, except for the crest portions of the kneading blades. Fig. 3 of Inoue et al discloses a kneader having a screw set with screw segments 1a and rotor segments 1b. It is undisputed that the screw segments 1a and rotor segments 1b have substantially different sectional shapes (see response filed September 25, 2002, paragraph bridging pp. 5-6). The screw segments 1a and rotor segments 1b thus do not teach the claimed invention.

The Examiner has therefore relied on the unremarkable fact that the rotor segment 1b has the same shape as *itself* (note that paragraph 2 of the final Office Action relies on rotor segment “1b” as both the rotor segment and the screw segment), the disclosure of different crest portions of the rotor segment 1b stemming from the different tip portions 7a, 7b and 7c.

Applicants have submitted first and second declarations of Dr. Kimio Inoue, the first named inventor of Inoue et al, on August 1, 2003 and November 17, 2003, respectively. According to the Inoue declarations, “rotor segment” and “screw segment” are terms of art

for structurally different elements, and one skilled in the art would not identify a rotor segment as a screw segment (see, e.g., second Inoue declaration, paragraphs 6-11).

Applicants respectfully submit that this is evidence that the plain meaning of “rotor segment” is different from the plain meaning of “screw segment,” and that this precludes interpretation of the rotor segment 1b of Inoue et al to be both a rotor segment and a screw segment. Thus the fact that the rotor segment 1b in Fig. 3 of Inoue et al has the same shape as itself has no bearing on the obviousness of the claims.

Accordingly, one cannot properly rely on the rotor segment 1b of Inoue et al to be both a screw segment and a rotor segment. Moreover, it is undisputed that the screw segments 1a and rotor segments 1b in Inoue et al have substantially different sectional shapes. Accordingly, Inoue et al fails to teach a screw segment having the same sectional shape as a rotor segment, except for the crest portions of the kneading blades.

The claims also recite an extruder wherein the extruder barrel has an extrusion opening at the axial end thereof. The *non-extruding* kneader in Figs. 1-3 of Inoue et al lacks an extrusion opening at an axial end but instead has a mid-bottom opening, and so this represents a further difference as compared to the claimed extruder. In recognition of this shortcoming, the Examiner has taken the position that it would have been obvious in view of the kneader/extruder Fig. 12 of Inoue et al to have modified the non-extruding kneader of Figs. 1-3 to provide an extrusion opening at the axial end thereof. However such a modification, even if it were obvious, would still not teach the claimed invention.

The first embodiment in Figs. 1-3 of Inoue et al is simply a “kneading apparatus” (col. 4, line 40). Since it is not an extruder, it lacks an extrusion opening at an end thereof. Instead it simply has an un-numbered bottom discharge opening for the kneaded material.

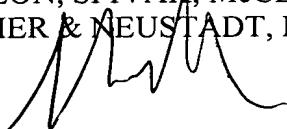
The device of Figs 11-15 of Inoue et al, on the other hand, a kneader/extruder (col. 10, lines 50-53) and so has an extrusion opening at the axial end of the barrel (col. 11, lines 1-

3). The Examiner deems that this suggests modifying the non-extruding kneader of Figs. 1-3 to provide an extrusion opening at the axial end thereof. However, since this would then convert the non-extruding kneader of Figs. 1-3 to a kneader/extruder, one skilled in the art would in this case also modify the screw sets of Figs. 1-3 according the screw sets of the kneader/extruder of Figs 11-15. It is evident from Fig. 11 of Inoue et al that the sectional shape of the rotor segments 21b of the kneader/extruder is different from the sectional shape of a screw segment thereof (an exemplary sectional shape of a screw segment is seen in Fig. 3), and so any modification of the first embodiment of Inoue et al in view of the second embodiment which may have been obvious to one skilled in the art would not correspond to the claimed invention wherein a screw segment of a screw set has the same sectional shape as a rotor segment of the screw set, except for the crest portions of the kneading blades.

Appellants therefore believe that the final rejection is improper and request that it be REVERSED.

Respectfully submitted,

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APPENDIX OF APPEALED CLAIMS

Claim 10: A twin-screw extruder for mixing and dispersing a material to be kneaded into a kneaded product having a desired state of kneading and extruding the product from a tip end thereof, said extruder comprising:

 a barrel having two intercommunicating chambers and an extrusion opening at a tip end thereof; and

 a screw set mounted in each of said chambers so as to not completely mesh with one another, each of said screw sets comprising:

 a rotor segment comprising at least one kneading rotor, said kneading rotor having a plurality of kneading blades which provide a plurality of tip clearances different from each other at least in the circumferential direction, said kneading rotor having a constant sectional shape in the axial direction, as viewed in a section transverse to the axial direction, except for crest portions of said kneading blades; and

 a screw segment comprising at least one screw blade, said screw segment, except for crest portions of the screw blades thereof, having the same sectional shape as said at least one rotor segment comprising at least one kneading rotor, as viewed in a section transverse to the axial direction, except for the crest portions of said kneading blades.

Claim 11: The screw set in a twin-screw extruder according to claim 10, wherein said rotor segment provides a plurality of tip clearances different from each other in the axial direction of said rotor segment.

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Claim 12: The screw set in a twin-screw extruder according to claim 10, wherein said same sectional shape is symmetric.

Claim 13: The screw set in a twin-screw extruder according to claim 10, wherein said screw sets rotate in the same direction.

EVIDENCE APPENDIX

1. First Inoue declaration of August 1, 2003.
2. Second Inoue declaration of November 17, 2003.

RELATED PROCEEDINGS APPENDIX

There are no related proceedings.